

WHAT IS CLAIMED IS:

5 1. An image forming apparatus comprising an electrophotographic photosensitive member, a charging means for applying voltage to a charge member to charge the electrophotographic photosensitive member, a static latent image forming means for forming a static latent image on the charged electrophotographic photosensitive member, and a developing means for developing the electrostatic latent image,

10 wherein the developing means is provided with at least a developer holding member for holding a developer containing a toner on its surface and a developer regulating member for regulating a layer thickness of a developer layer on the developer holding member,

15 the electrophotographic photosensitive member and the developer holding member are set opposite to each other to form a developing section, the developer regulating member regulates the developer to form a thin layer of the developer on the developer holding member surface, and in the developing section, the toner in the developer is transferred to the electrostatic latent image held on the surface of the electrophotographic photosensitive member to form a toner image,

25 a peripheral speed of the electrophotographic photosensitive member is 150 mm/second or more,

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the toner has a weight-average particle diameter of from 5 to 12  $\mu\text{m}$ , and of the toner having a circle-equivalent diameter of 3  $\mu\text{m}$  or more, particles with a circularity  $a$  of 0.900 or more found according to formula (1)

$$\text{circularity } a = L_0/L \quad (1)$$

(wherein  $L_0$  denotes the circumference of a circle having the same projected area as a particle image, and  $L$  denotes the circumference of the particle image)

are present at a rate of 90% or more in a number-based cumulative value, and the toner satisfies the following conditions i) or ii):

i) a relationship between a cut rate  $Z$  and a weight-average particle diameter  $X$  of the toner satisfies expression (2)

$$\text{cut rate } Z \leq 5.3 \times X \quad (2)$$

(wherein the cut ratio  $Z$  is represented by expression (3)

$$Z = (1 - B/A) \times 100 \quad (3)$$

where  $A$  represents a concentration (the number of particles/ $\mu\text{l}$ ) of all particles measured with a flow-type particle image analyzer FPIA-1000 manufactured by TOA MEDICAL ELECTRONICS CO., LTD., and  $B$  represents a concentration (the number of particles/ $\mu\text{l}$ ) of the measured particles the circle-equivalent diameters of which are 3  $\mu\text{m}$  or more), and

a relationship between a number-based cumulative

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value Y of particles having a circularity of 0.950 or more and a weight-average particle diameter X of the toner satisfies expression (4)

$$Y \geq \exp 5.51 \times X^{-0.645} \quad (4)$$

(where X is in the range from 5.0 to 12.0  $\mu\text{m}$ ); and

ii) a relationship between a cut ratio Z and a weight-average particle diameter satisfies expression

$$\text{cut rate } Z > 5.3 \times X \quad (5)$$

and a relationship between a number-based cumulative value Y of particles having a circularity of 0.950 or more and a weight-average particle diameter X satisfies expression (6)

$$Y \geq \exp 5.37 \times X^{-0.645} \quad (6)$$

(where X is in the range from 5.0 to 12.0  $\mu\text{m}$ ).

2. The image forming apparatus according to claim 1, wherein a peripheral speed ratio of the developer holding member to the electrophotographic photosensitive member is 1.2 or less at the developing section.

3. The image forming apparatus according to claim 1, wherein the developer regulating member comprises an elastomeric member, and the free end of the developer regulating member is brought into contact with the developer holding member on the upstream side relative to the developing section in the rotation direction of

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the developer holding member, forming the thin layer of the developer on the developer holding member surface.

4. A process-cartridge comprising an  
5 electrophotographic photosensitive member, a charging means for applying voltage to a charge member to charge the electrophotographic photosensitive member, and a developing means for developing an electrostatic latent image,

10 wherein the process cartridge is used for an image forming apparatus in which a toner in a developer is transferred to an static latent image to form a toner image, and the toner image is transferred to a transfer material to form an image, and is so constructed as to  
15 be detachably mountable on the apparatus,

the developing means is provided with at least a developer holding member for holding a developer containing a toner on its surface and a developer regulating member for regulating a layer thickness of a  
20 developer layer on the developer holding member,

the electrophotographic photosensitive member and the developer holding member are set opposite to each other to form a developing section, the developer regulating member regulates the developer to form a  
25 thin layer of the developer on the developer holding member surface, and in the developing section the toner in the developer is transferred to the electrostatic

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latent image held on the surface of the  
electrophotographic photosensitive member to form a  
toner image,

a peripheral speed of the electrophotographic  
photosensitive member is 150 mm/second or more,

the toner has a weight-average particle diameter  
of from 5 to 12  $\mu\text{m}$ , and of the toner having a circle-  
equivalent diameter of 3  $\mu\text{m}$  or more, particles with a  
circularity  $a$  of 0.900 or more found according to  
formula (1)

$$\text{circularity } a = L_0/L \quad (1)$$

(wherein  $L_0$  denotes the circumference of a circle  
having the same projected area as a particle image, and  
 $L$  denotes the circumference of the particle image)  
are present at a rate of 90% or more in a number-based  
cumulative value, and the toner satisfies the following  
conditions i) or ii):

i) a relationship between a cut rate  $Z$  and a  
weight-average particle diameter  $X$  of the toner  
satisfies expression (2)

$$\text{cut rate } Z \leq 5.3 \times X \quad (2)$$

(wherein the cut rate  $Z$  is represented by  
expression (3))

$$Z = (1 - B/A) \times 100 \quad (3)$$

where  $A$  represents a concentration (the number of  
particles/ $\mu\text{l}$ ) of all particles measured with a flow-type  
particle image analyzer FPIA-1000 manufactured by TOA

MEDICAL ELECTRONICS CO., LTD., and B represents a concentration (the number of particles/ $\mu\text{l}$ ) of the measured particles the circle-equivalent diameters of which are 3  $\mu\text{m}$  or more), and

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5 a relationship between a number-based cumulative value Y of particles having a circularity of 0.950 or more and a weight-average particle diameter X of the toner satisfies expression (4)

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$$Y \geq \exp 5.51 \times X^{-0.645} \quad (4)$$

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10 (where X is in the range from 5.0 to 12.0  $\mu\text{m}$ ); and 61

ii) a relationship between a cut ratio Z and a weight-average particle diameter satisfies expression

$$\text{cut rate } Z > 5.3 \times X \quad (5)$$

and a relationship between a number-based cumulative value Y of particles having a circularity of 0.950 or more and a weight-average particle diameter X satisfies expression (6)

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$$Y \geq \exp 5.37 \times X^{-0.545} \quad (6)$$

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(where X is in the range from 5.0 to 12.0  $\mu\text{m}$ ).

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25 5. The process-cartridge according to claim 4, which further has, and is combined as one unit with, at least one means selected from the group consisting of a static latent image forming means for forming an electrostatic latent image on the charged electrophotographic photosensitive member, a means for transferring the toner image to a transfer material and

a cleaning means for cleaning the surface of the electrophotographic photosensitive member after transfer.

5           6. The process-cartridge according to claim 5, wherein a peripheral speed ratio of the developer holding member to the electrophotographic photosensitive member is 1.2 or less at the developing section.

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          7. The process-cartridge according to claim 4, wherein the developer regulating member comprises an elastic member, and the free end of the developer regulating member is brought into contact with the  
15   developer holding member on the upstream side relative to the developing section in the rotation direction of the developer holding member, forming the thin layer of the developer on the developer holding member surface.

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